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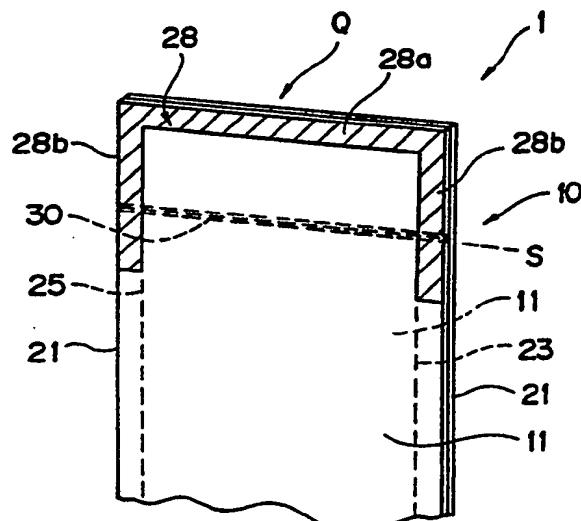
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Yoshiji Moteki

(54) Gusset bags with both a resealable closure and a fused seal

(57) A gusset bag 1 comprises a tubular body 10 with a pair of opposing flat portions 11, 11 forming front and back portions, gusseted side portions, a resealable zipper element 30 mounted on the inner surface of the flat portions and a fused seal portion 28 formed across the opening of the bag body with side seals 28b extending from the opening end to beyond the zipper element. The zipper may be attached by folding outwardly and optionally slitting the ends of the flat portions and side portions (see Figure 5) and mounting the zipper on the folded out portions prior to refolding and sealing the end of the bag.

F I G. 8



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FIG. 1

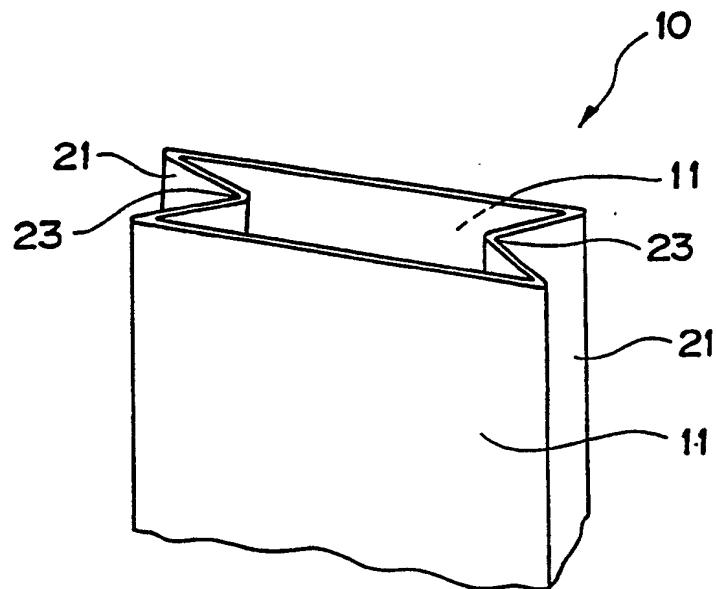
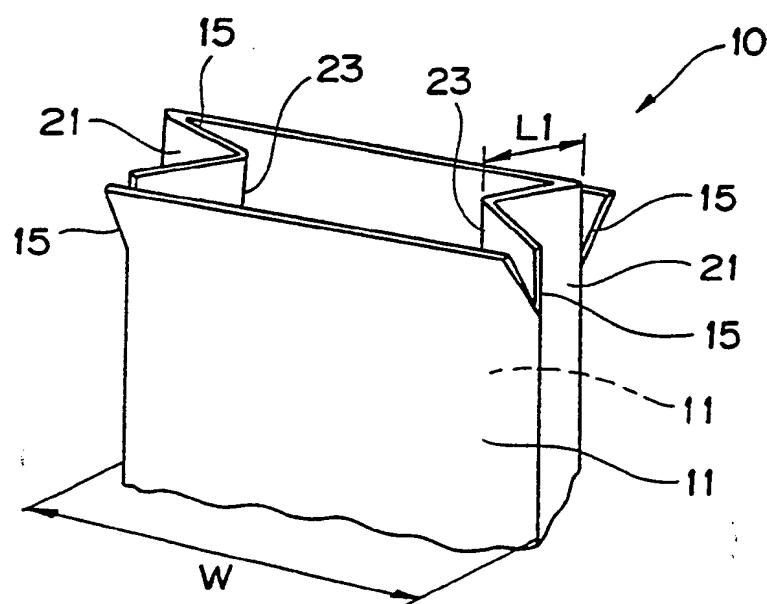
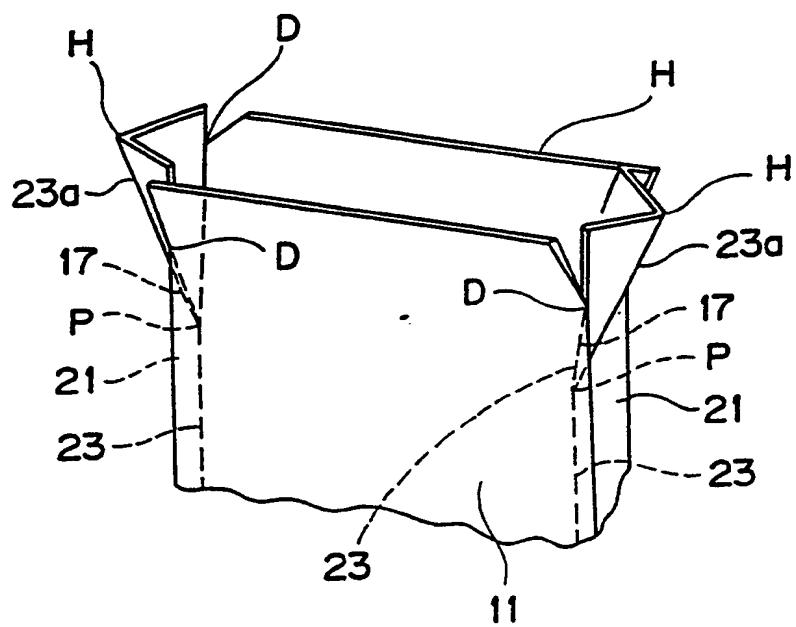


FIG. 2



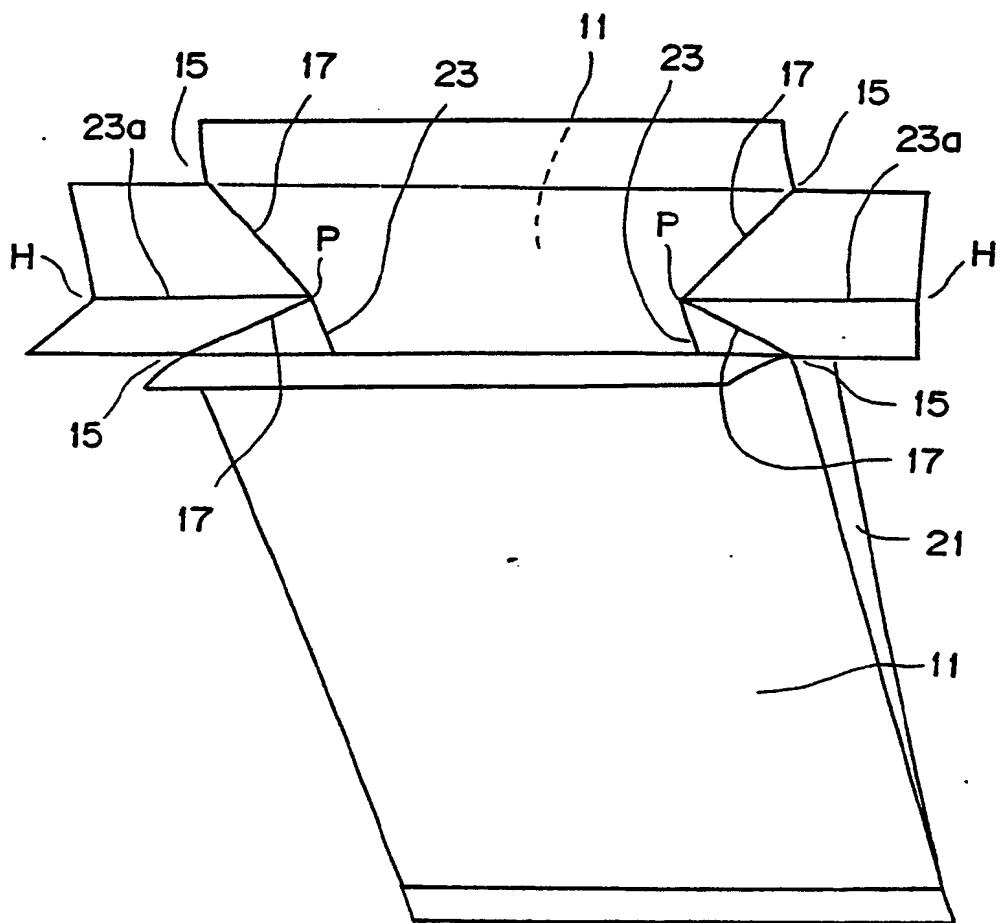
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FIG. 3



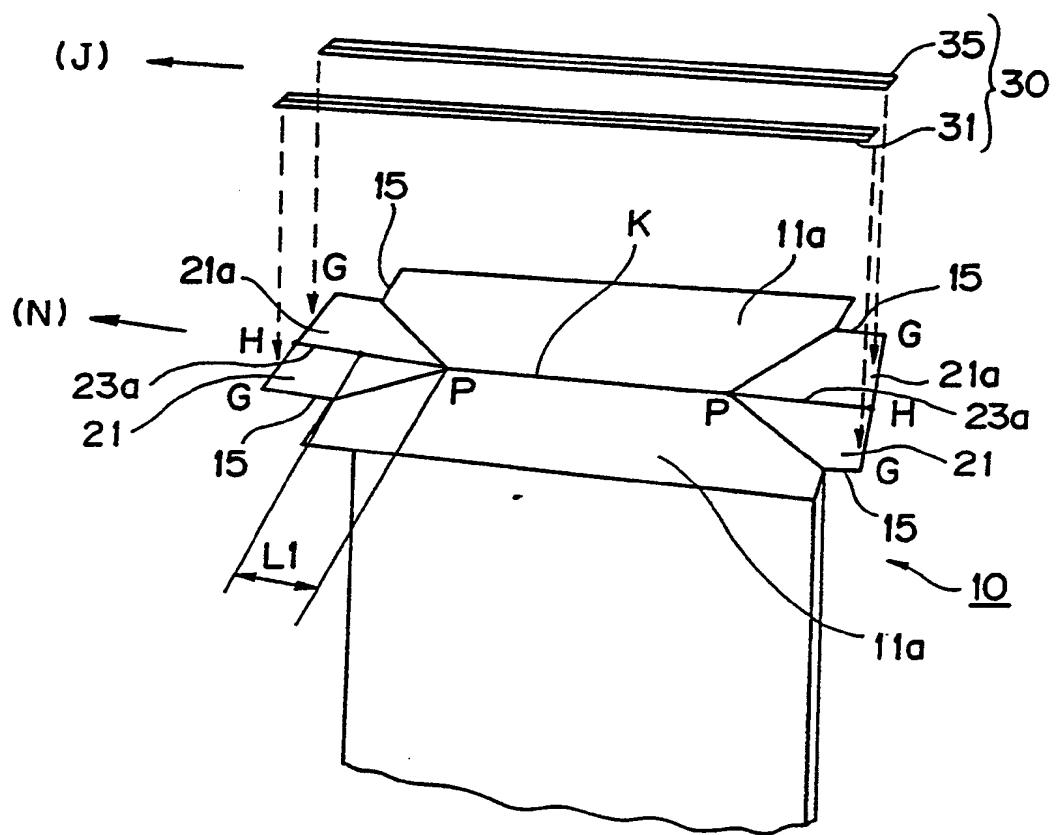
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FIG. 4



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FIG. 5



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FIG. 6

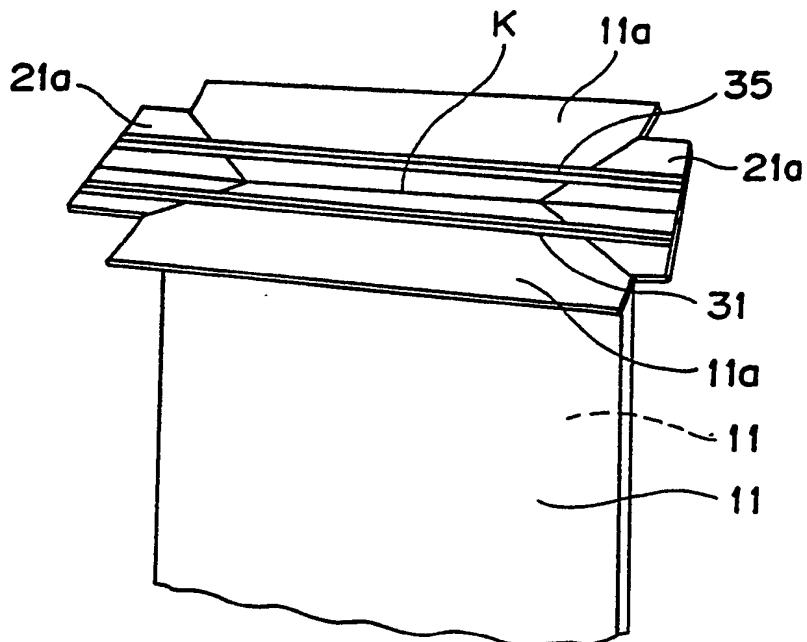
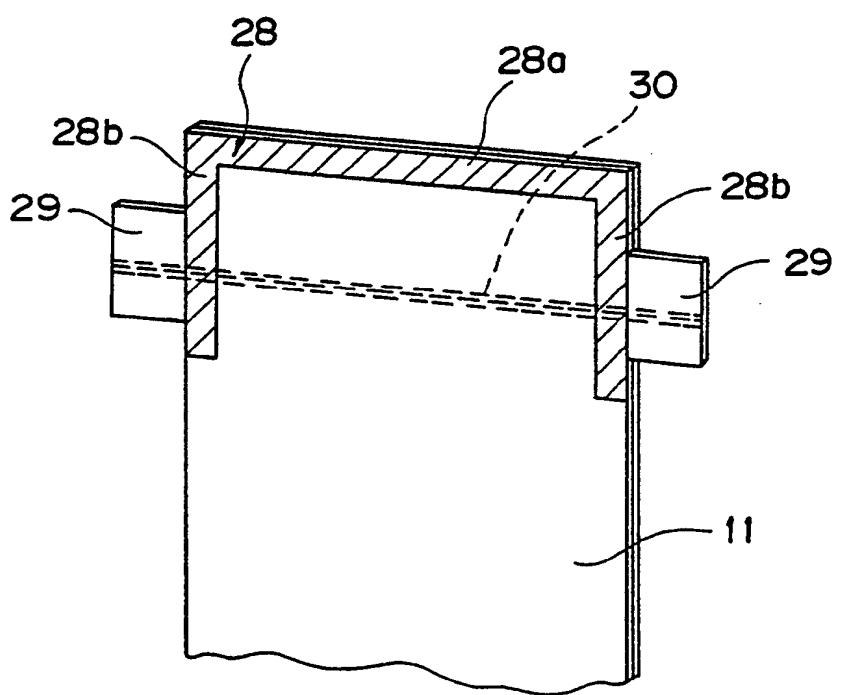


FIG. 7



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FIG. 8

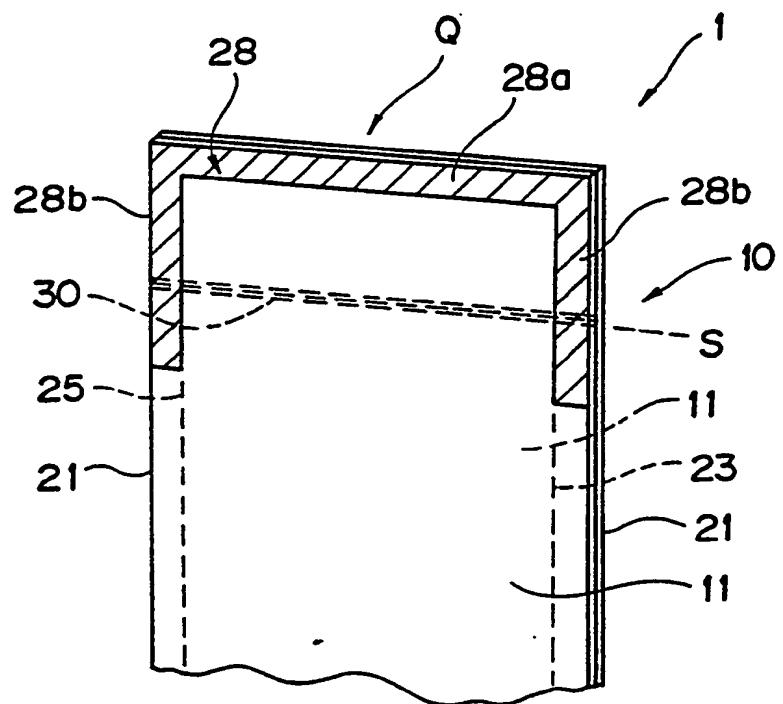
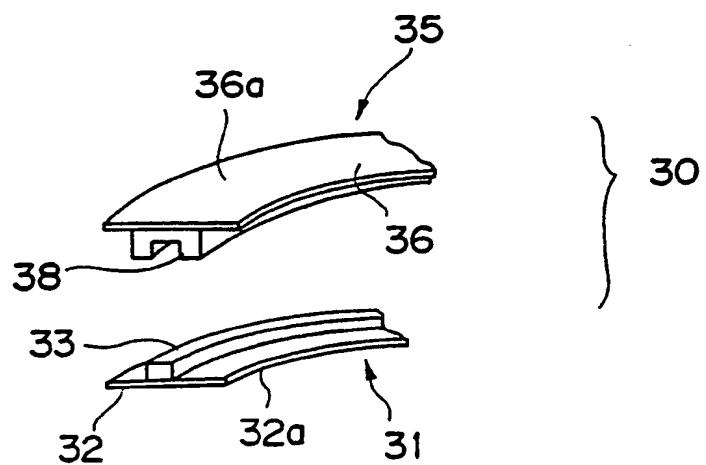


FIG. 9



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FIG. 10

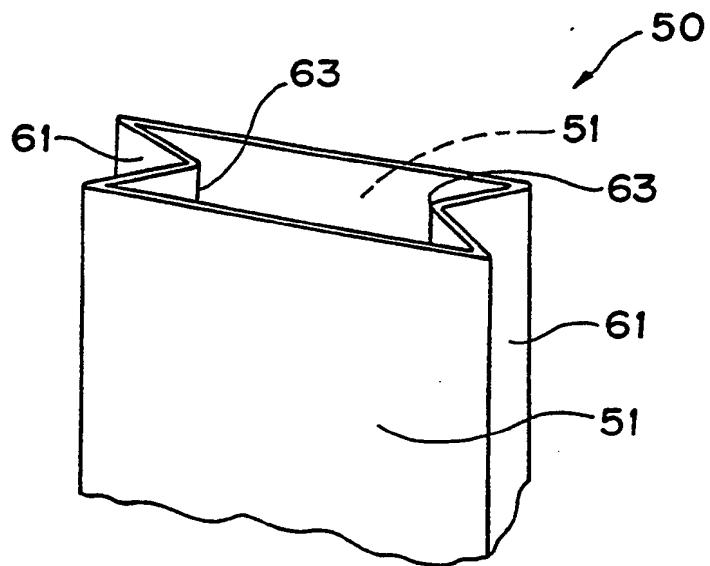
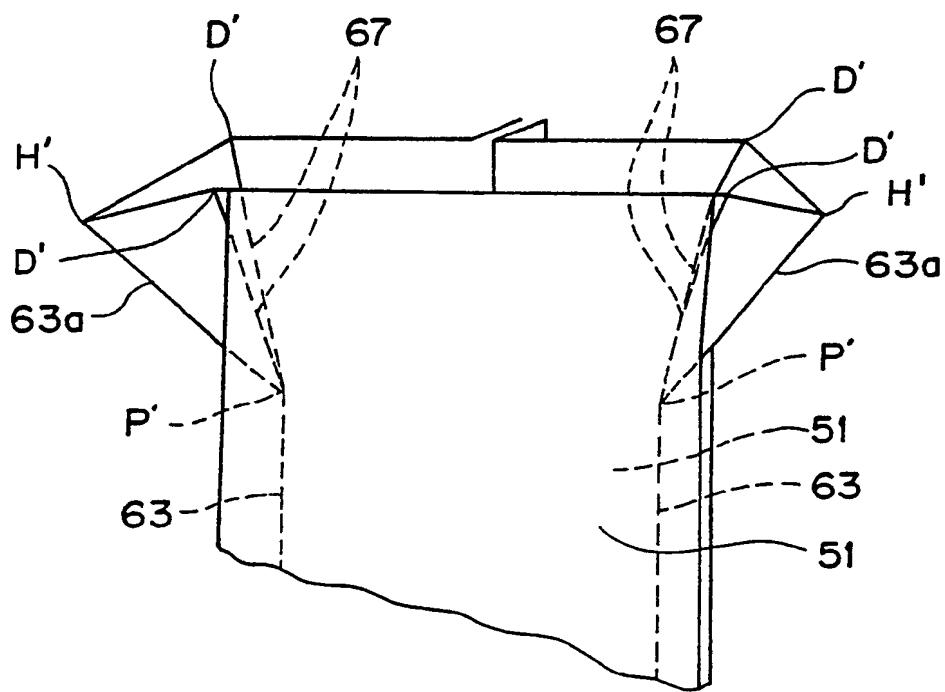
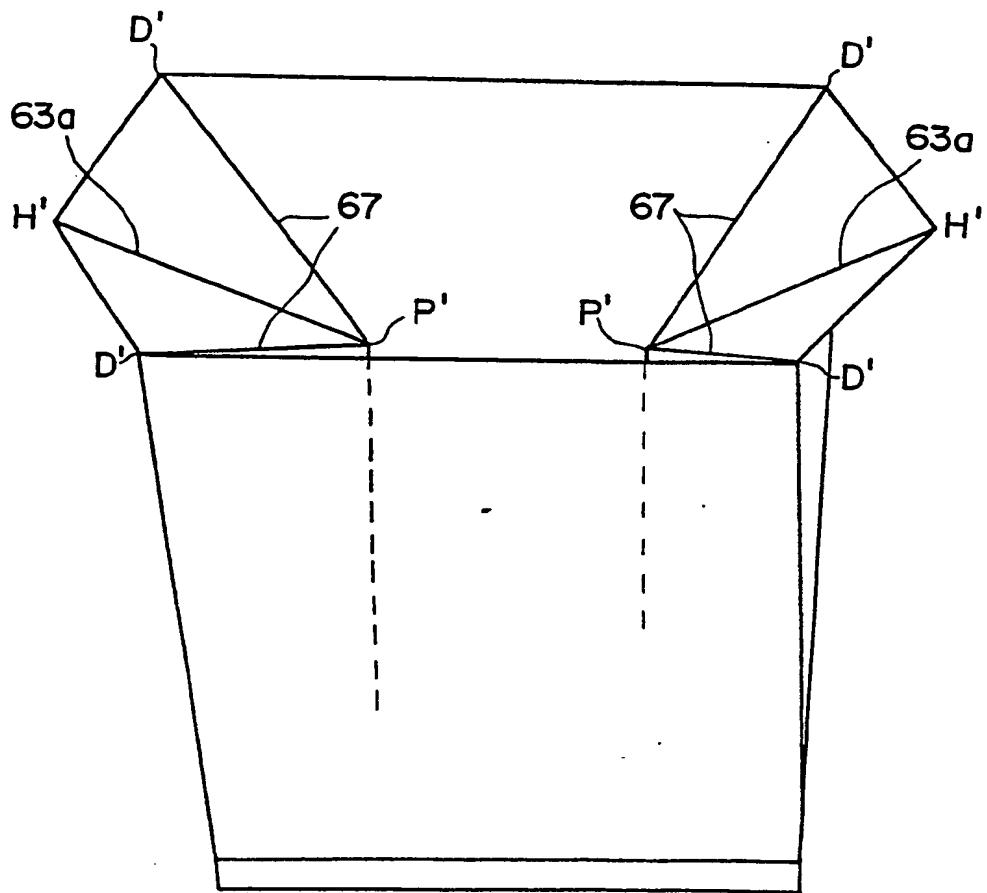


FIG. 11

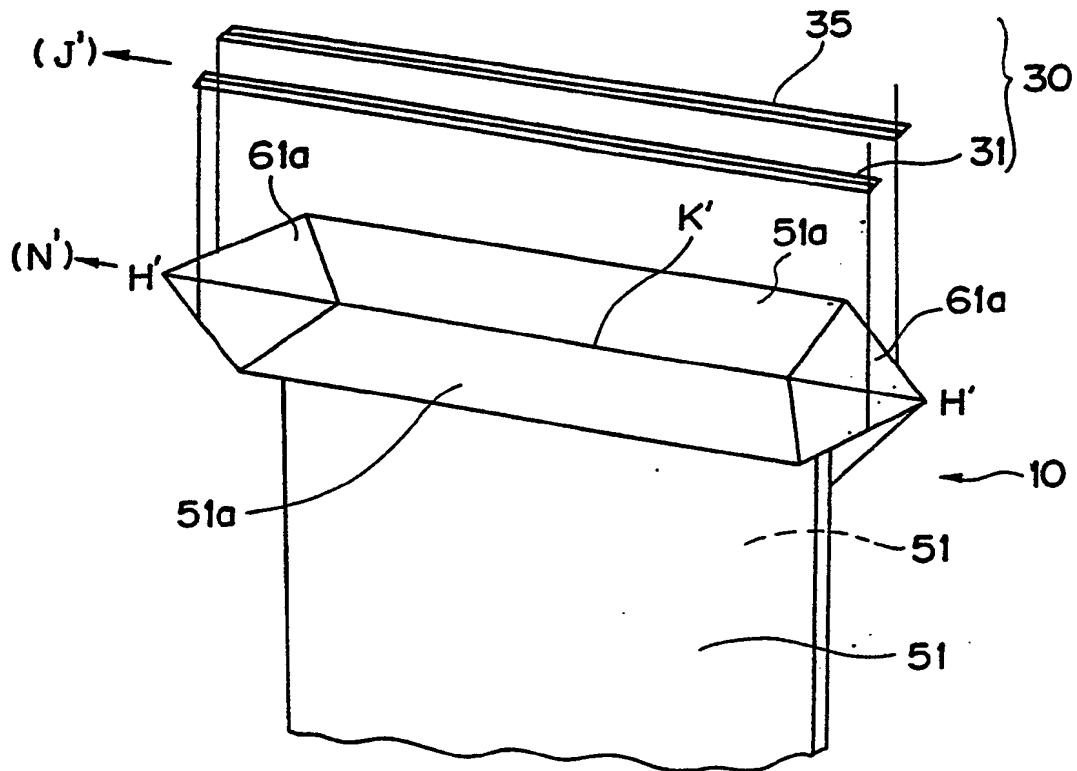


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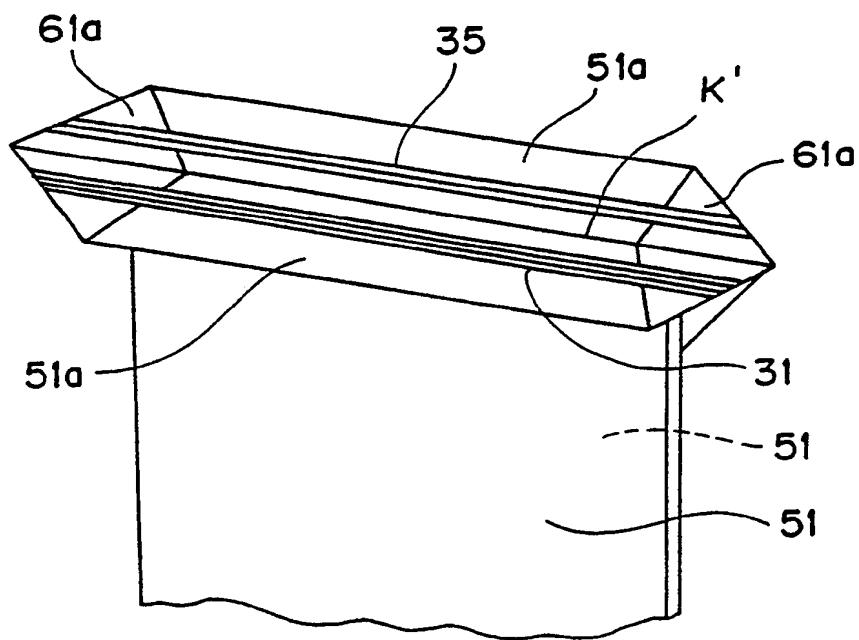
FIG. 12



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F I G. 13



F I G. 14



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FIG. 15

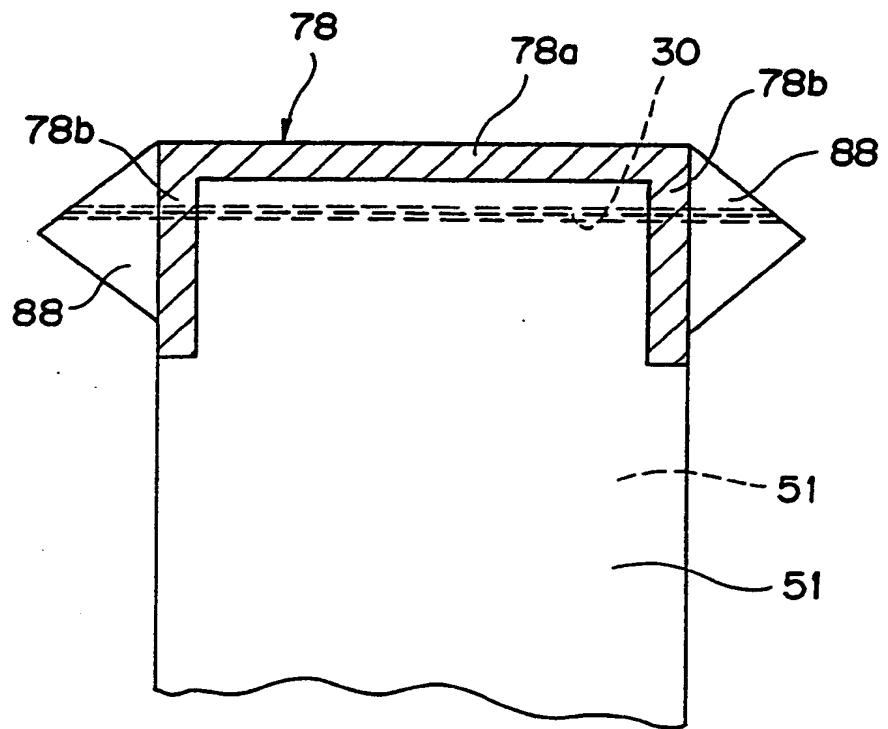
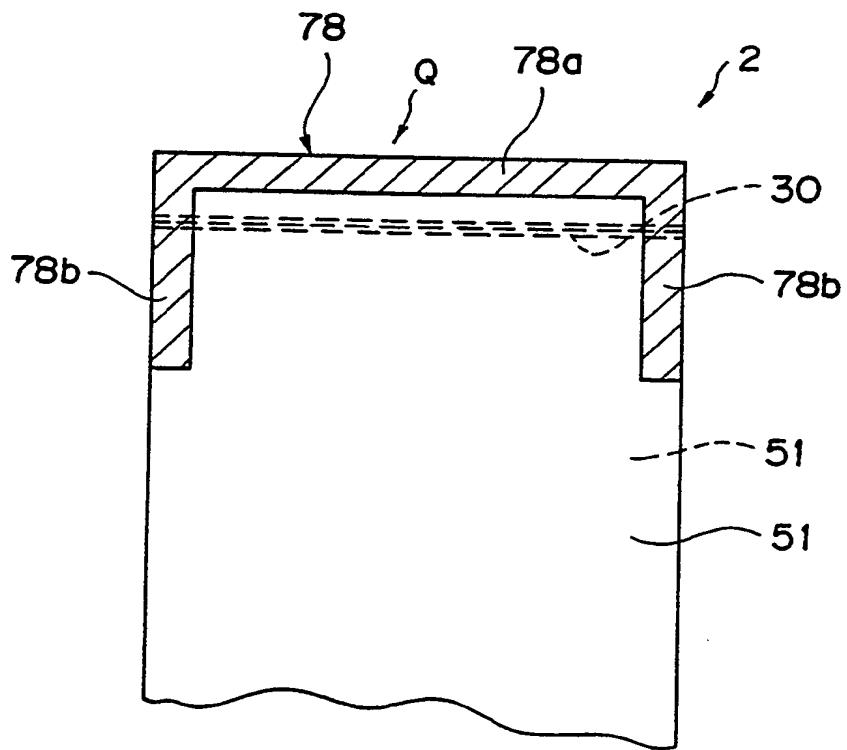


FIG. 16



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FIG. 17

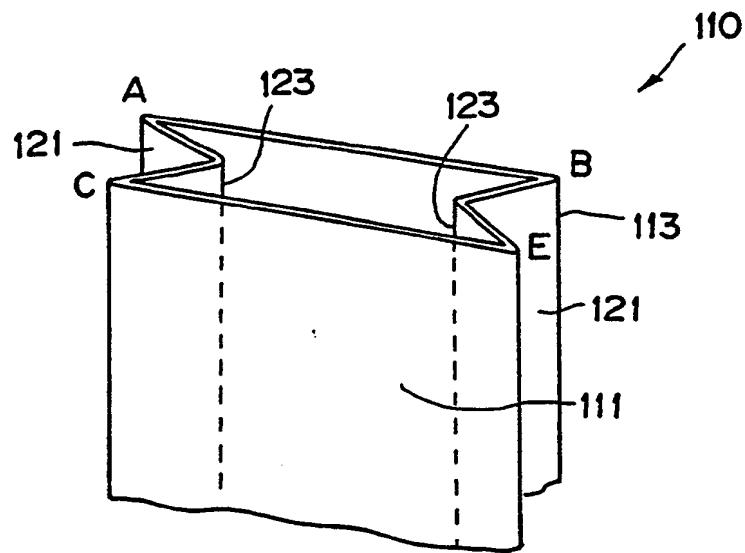
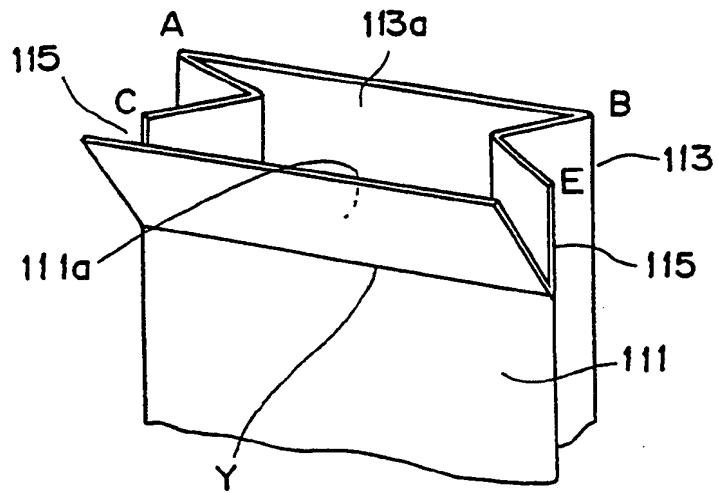


FIG. 18



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FIG. 19

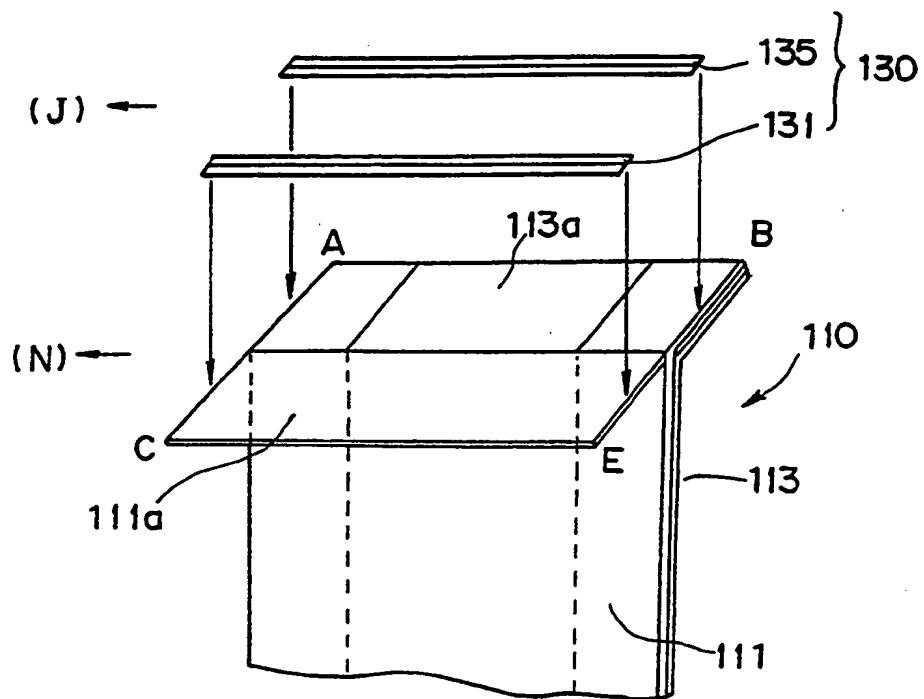
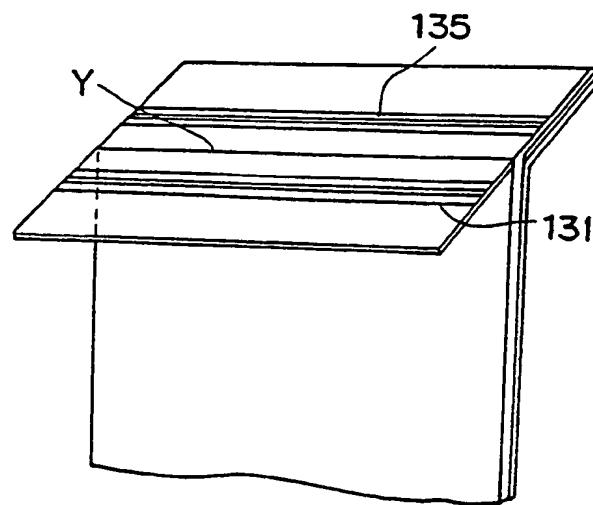


FIG. 20



13 / H
FIG. 21

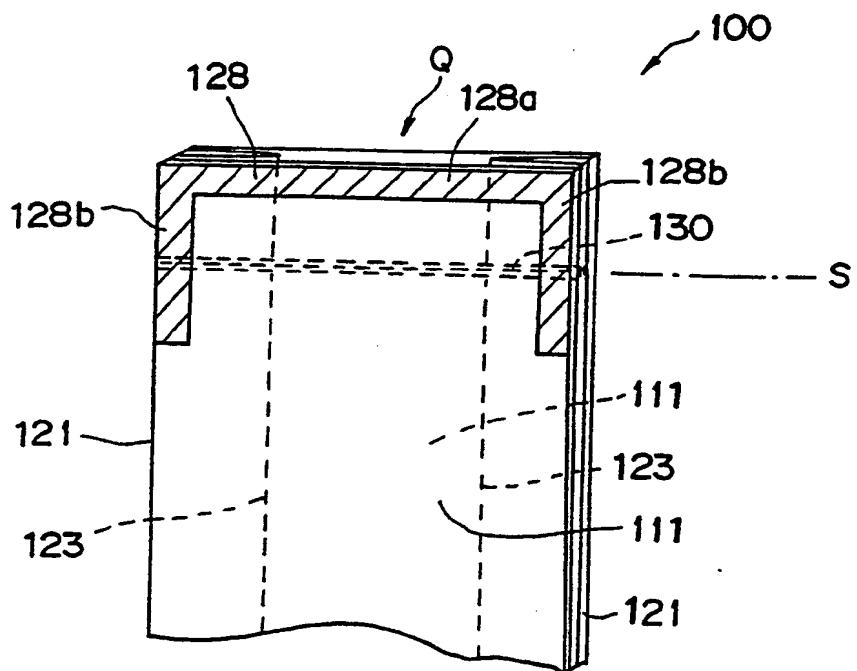
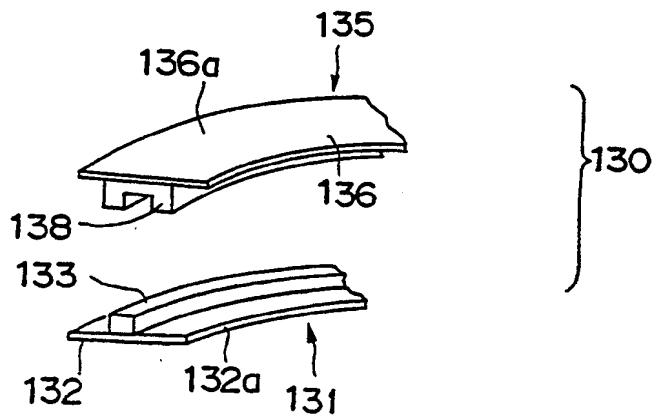


FIG. 22



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FIG. 23

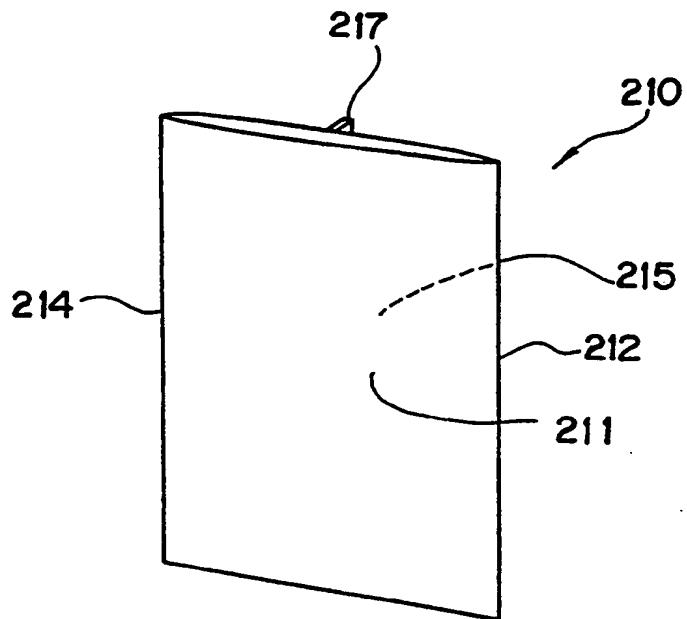
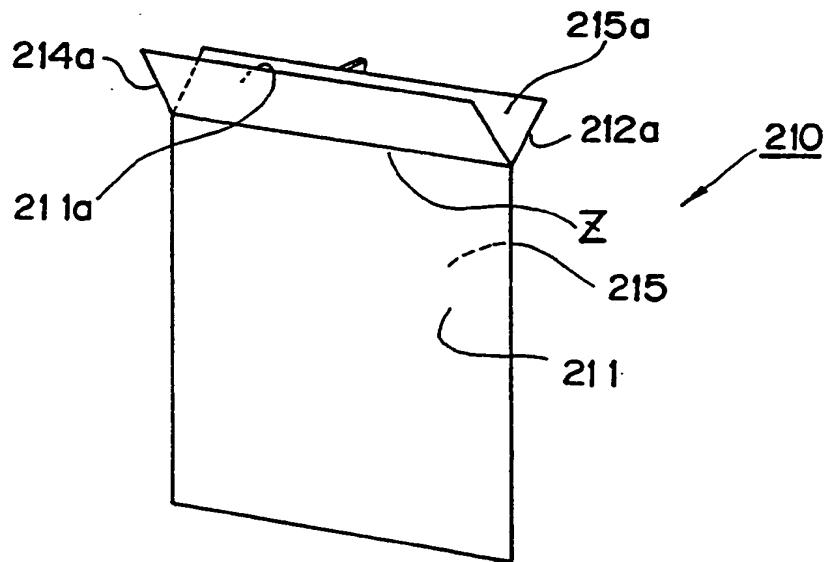


FIG. 24



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FIG. 25

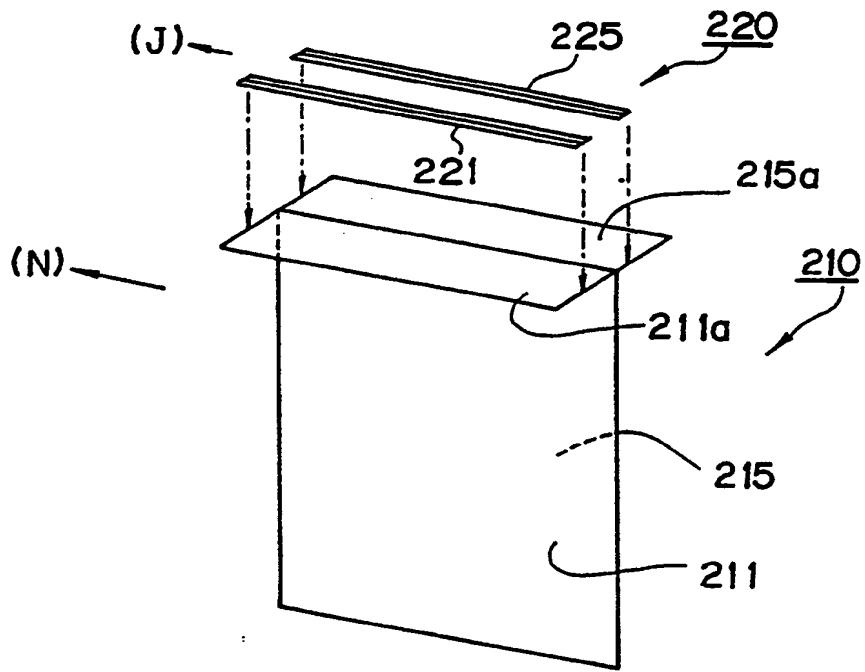
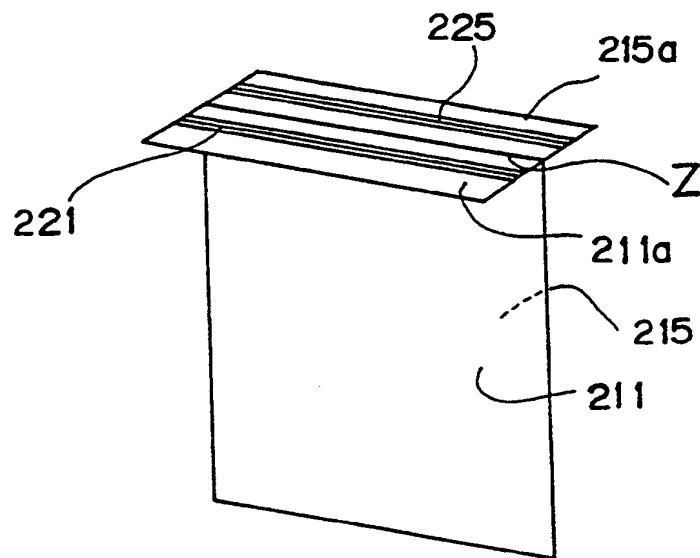


FIG. 26



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FIG. 27

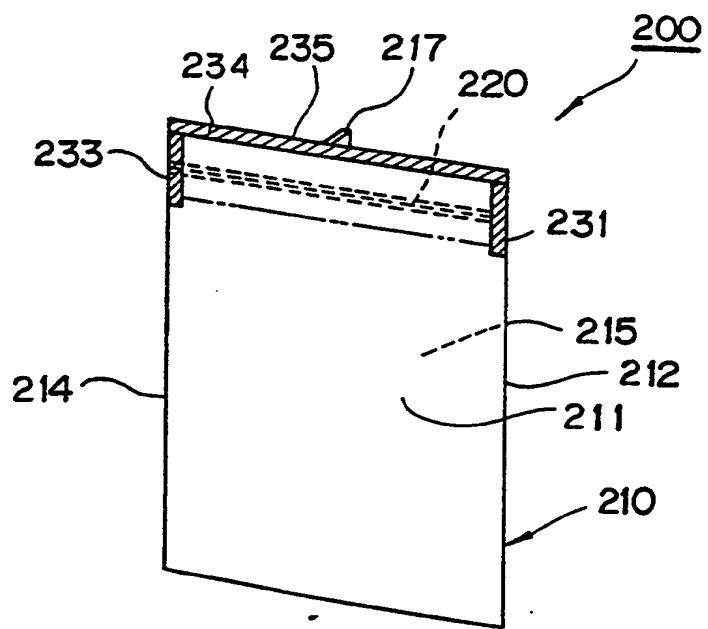
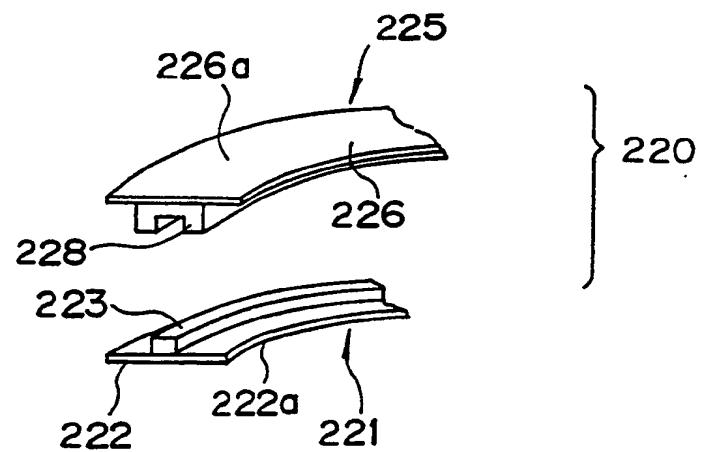


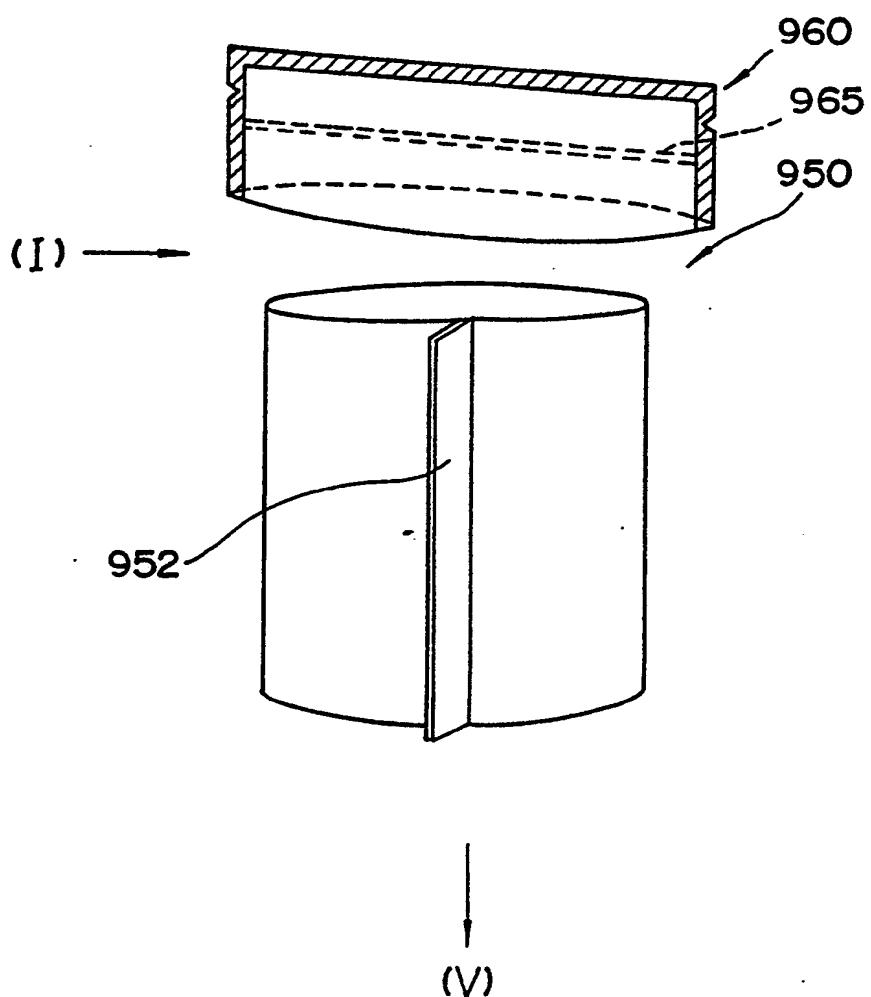
FIG. 28



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FIG. 29

PRIOR ART



ZIPPERED BAGS AND METHOD OF FORMING THE SAME**BACKGROUND OF THE INVENTION**

This invention relates to zippered bags, and more particularly, gusset bags and flat bags each provided with a zipper element for opening or closing an end opening of the bag through which a content filling in the bag can be easily taken out, and also is concerned with methods of forming such zippered bags.

In the known art, there has been provided a flat bag container having opposing flat portions, and four side peripheries of such bag are heat sealed (four side seal bag), and an opening of the bag through which an inner content can be taken out is closed or opened by providing a zipper element. With such a flat bag, it is possible to manufacture the bag by making coincident the delivery direction of a film material forming a flat bag container with a supply direction of the zipper element, thus being advantageous in a productivity.

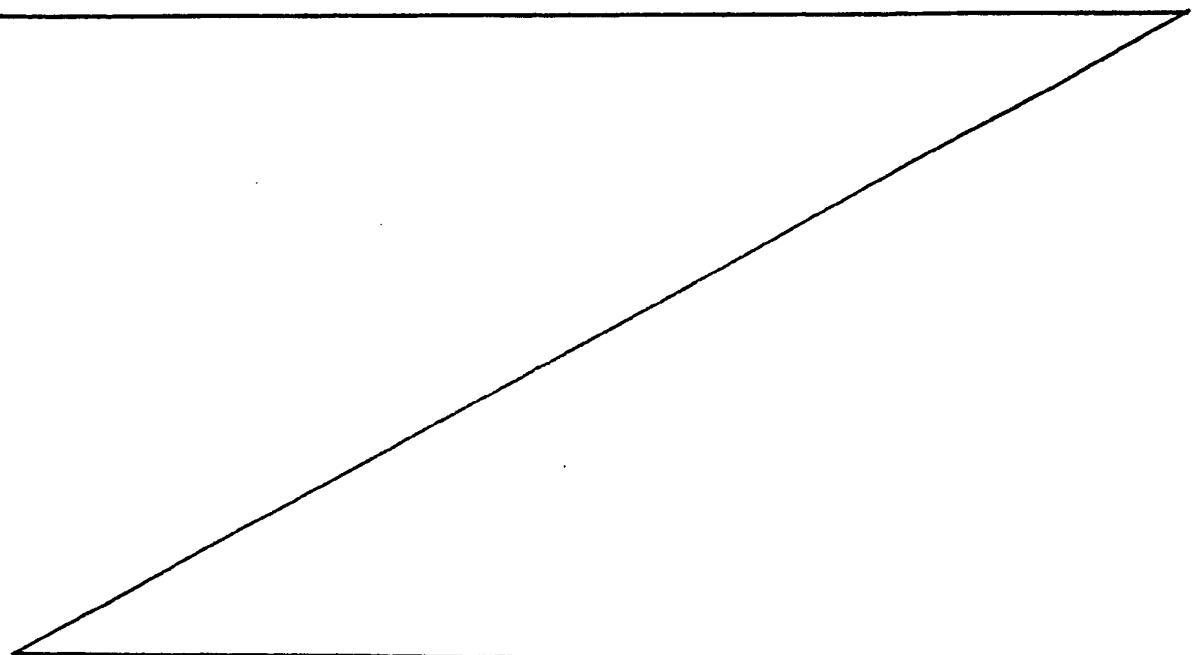
Further, recently, it is attempted to apply the zipper element to a bag other than the four side seal bag, and in such attempt, a cap shaped bag member provided with a zipper element is preliminarily prepared and the cap shaped bag member is then applied to a bag body prepared separately from the cap shaped bag member. For example, a gusset bag provided with gores at both side portions of the bag body

has a good self supporting property and a relatively large inner capacity, and accordingly, the usage thereof is widened and the application of the zipper element to the gusset bag has been desired.

However, since the gusset bag has a folded portion as gusset, there provided problems of difficult attachment of the zipper element.

Regarding bags other than the four side seal bag mentioned above, there is provided a bag which is generally formed of one sheet material and hence has a bonded edge like portion. Such prior art bag is shown in FIG. 29, as one example, in which, particularly, a central, i.e. back, bonded portion 952 is formed as a stepped portion providing no smooth surface portion. For this reason, it is difficult to surely apply such bag a cap shaped bag member, which is formed separately, provided with the zipper portion 965.

The present invention provides for a gusset bag having



one end to be formed as a bottom end and another end to be formed as an end opening through which a content packed in the gusset bag is taken out, the gusset bag comprising:

a bag body having tubular structure and composed of a pair of opposing flat portions constituting front and back side portions of the bag body and two side portions connecting front and back side portions at both side ends thereof and respectively having lines folded inward which extend along longitudinal directions of the side portions and along which the side portions are folded inward;

a zipper element mounted on inner surfaces of the flat portions at portions near the end opening of the bag body; and

a fused seal portion formed to and near the end opening portion of the bag body to substantially entirely seal the end opening portion, the fused seal portion including an end seal portion extending substantially along an entire length of the end opening and side seal portions extending from both ends of the end seal portion along the side ends of the flat portions of the bag body, the side seal portions each extending beyond the portions on which the zipper element is mounted, wherein a sealing process is carried out integrally with portions of the side portions near the end opening of the bag body, which are once inwardly folded along the folding lines and then drawn out and folded outward from the end opening of the bag body for once opening the end

opening.

Further the present invention provides for a method of forming a gusset bag provided with a zipper element characterized by the steps of preparing a bag body having a tubular structure and composed of a pair of opposing flat portions constituting front and back side portions of the bag body and two side portions connecting front and back side portions at both side ends thereof and respectively having lines folded inward which extend along longitudinal directions of the side portions and along which the side portions are folded inward, preparing a zipper element and mounting the zipper element on the flat portions at portions near the end opening of the bag body, and fusing the end opening of the bag body together with the outwardly folded side portions thereof to thereby seal an end opening portion of the bag body.

The preparing step may include a cutting step for cutting the bag body from the end opening thereof along lines connecting the flat portions and the side portions of the bag body to form four cuts each having a predetermined length.

In the foregoing aspects of this invention, the zipper element extends throughout a whole horizontal length of the bag body and the zipper element comprises a male member to be attached to the exposed one inner surface of the bag body and a female member to be engaged with the male member and attached to the exposed another inner surface of the bag body, the male and female members being attached at portions apart by equal distances from the base line.

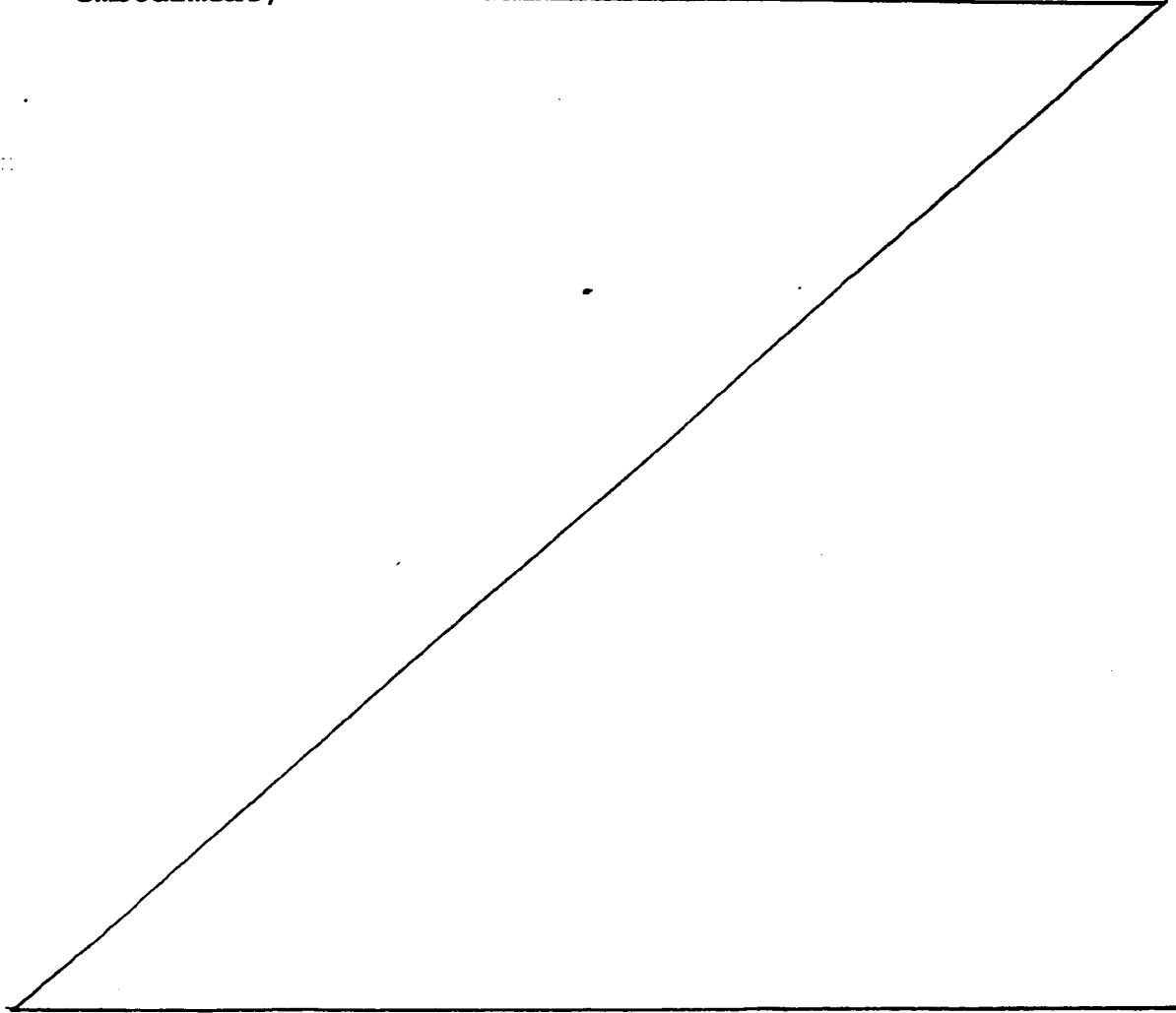
The invention is described further hereinafter, by way of example only, with reference to the accompanying

drawings in which:

Figs. 1 to 7 are perspective views of a gusset bag provided with a zipper element of a first embodiment of this invention in accordance with the forming steps thereof;

Fig. 8 is a perspective view of the gusset bag provided with the zipper element as a final product of the first embodiment;

Fig. 9 is a developed perspective view of the zipper element to be applied to the gusset bag of the first embodiment;



FIGS. 10 to 15 are perspective views similar to those of FIGS. 1 to 7 but showing a second embodiment of this invention;

FIG. 16 is a perspective view of the gusset bag provided with the zipper element as a final product of the second embodiment;

FIGS. 17 to 20 are perspective views similar to those of FIGS. 10 to 15 but showing a third embodiment of this invention.

FIG. 21 is a perspective view of the gusset bag provided with the zipper element as a final product of the third embodiment;

FIG. 22 is a developed perspective view of the zipper element to be applied to the gusset bag of the third embodiment;

FIGS. 23 to 26 are perspective views of a flat bag provided with a zipper element of a fourth embodiment of this invention in accordance with the forming steps thereof;

FIG. 27 is a perspective view of the flat bag provided with the zipper element as a final product of the fourth embodiment;

FIG. 28 is a developed perspective view of the zipper element to be applied to the flat bag of the fourth embodiment; and

FIG. 29 is a perspective view showing a method of attaching a zipper element to a bag provided with a mated

and bonded edge like portion according to a conventional manner.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One embodiment of a gusset bag provided with a zipper element of this invention will be first described hereunder with reference to FIGS. 1 to 9.

First, referring to FIG. 8, a gusset bag 1 provided with a zipper element 30 has a bag body 10 composed of a pair of opposing flat portions forming front and back portions 11 and 11 of the bag 1 and two side portions 21 and 21 having folding lines 23 and 23 which extend vertically substantially along the central lines of the side portions and along which the side portions 21 and 21 are folded inwardly. The bag body 10 is usually formed of a plastic film, paper, aluminium foil or lamination member of these materials, but according to this embodiment, the material for the bag body and the thickness thereof have no specific limitation. The zipper element 30 is formed to the inner surfaces of the flat portions 11 and 11 at portions near an end opening, i.e. mouth portion Q of the bag body 10. The zipper element 30 is formed to freely open or close the opening Q of the bag body 10 and usually formed of general kind of plastic material.

The bag body 10 has a fused seal portion 28, shown with hatching lines in FIG. 8, which seals an upper end area 28a

of the opening Q of the bag body 10 and side areas 28b and 28b extending from both the lateral ends of the upper end area 28a towards portions further inward a fixing portion S of the zipper element 30. That is, the side areas 28b and 28b extend downward, in the illustrated state, beyond the zipper element fixing line S. The sealing function of the seal portion 28 is performed by folding and drawing out the folding lines of two side portions outward from the opening end in a direction reverse to the original, i.e., inward, folding direction for once opening the end opening of the bag body 10. This function is integrally associated with a portion of a side tab 29 formed in a fold in state. This condition will be described hereinafter with reference to forming steps of the gusset bag.

The zipper element 30 has a belt shape structure, as shown in FIG. 9, in combination of a male member 31 and a female member 35 to be engaged with the male member 31. The male member 31 is composed of a flat base plate 32 and a belt like protruded portion 33 formed on one side of the base plate 32. The other side 32a of the base plate 32 has a flat surface capable of being bonded to the inner surface of one flat portion 11 of the bag body 10. The female member 35 is composed of a flat base plate 36 and a belt like member 38 having a recessed portion formed on one side of the base plate 36. The other side 36a of the base plate 36 has a flat surface capable of being bonded to the inner

surface of the other flat portion 11 of the bag body 10. The sizes of the protruded portion of the male member 31 and the recessed portion of the female member 35 are designed to be tightly engaged with each other when mated.

The gusset bag 1 according to the first embodiment of this invention is formed by way of the following steps.

First, with reference to FIG. 1, there is prepared a cylindrical or tubular bag body 10 formed with a pair of flat portions 11 and 11 constituting front and back side portions of the bag body 10 and two side portions 21 and 21 having lines 23 and 23 to be folded inwardly, the lines extending vertically substantially along the central lines of the side portions 21 and 21.

Next, as shown in FIG. 2, four cuts 15, 15, 15 and 15 are made along lines through which the side portions 21 and 21 are connected to the flat portions 11 and 11 at four corner portions of the bag body 10 so as to extend from the upper ends, as viewed, of the bag body to portions each apart from the upper end by a predetermined distance. These cuts 15 have substantially the same cut depth. These cuts 15 are formed to ensure a portion to which the zipper 30 can be surely attached and, in a case where, a width L_1 of the side portion to be folded is relatively small with respect to a width W of the bag body 10, for example $L_1/W = 0.10$ to 0.13, the formation of such cuts is particularly effective.

In the next step, as shown in FIGS. 3 and 4, the

opening of the bag body 10 is opened by partially folding reversely, i.e. outwardly, the folding line 23 and 23 at optional points P and P being base points. Namely, portions of the folding lines 23 and 23 each having a length from the point P to a point H at the upper end of the bag body are reversely, i.e. outwardly, pulled out and folded as folding lines 23a and 23a. According to this reverse folding, lines connecting the four corner portions, in this example, four end portions D of four cuts 15, of the bag body 10 to the points P are necessarily formed as four arris lines 17, 17, 17 and 17 as shown in FIG. 3. The arris lines 17 project in the inward direction of the bag body 10, respectively.

As shown in FIG. 5, in the next step, the upper portions of the flat portions 11 and the side portions 21 are together folded or bent outward with a base line K which connects the points H and H, i.e. upper ends of the outwardly folded lines 23a, thus forming four opened surfaces 11a, 11a and 21a, 21a as exposed inner side surfaces of the bag body 10. In this example, as the base points P are set so that length of the line GH shown in FIG. 5 is substantially equal to the width L1, the opened surfaces 11a and 21a constitute flat surfaces lying substantially the same plane. In this step, the bag body 10 is delivered in a direction N, and during this step, the belt like male member 31 and female member 35 forming the zipper element 30 are conveyed above the opened surfaces 11a

and 21a along a direction J, thus the conveying directions N and J of the bag body 10 and the zipper element 30 accord with each other, whereby the working of the bag body can be easily made, and is suitable for a machine working.

Further, in the next step, as shown in FIG. 6, the male member 31 and the female member 35 forming the zipper element 30 are fixed to the exposed opened surfaces 11a and 21a at portions apart from equal distances from the central line, i.e. line K, usually in parallel with each other. The fixing of the male and female members 31 and 35 is usually effected by a heat seal method.

Then, as shown in FIG. 7, the opened surfaces 11a and 21a are closed so that the male and female members 31 and 35 are mated and engaged with each other so as to function as the zipper element 30. Thereafter, the upper end portion 28a forming the opening end of the bag body 10 and the side portions 28b and 28b are both fused at the upper sides of the bag body 10 to form a tight close seal portion. After this step, tubs 29 and 29 projecting from the sides of the bag body 10 are formed when the opened surfaces 11a and 21a are mated and are then cut out along the vertical side ends of the bag body 10, thus completing the gusset bag provided with the zipper element such as shown in FIG. 8.

A content to be contained in gusset bag thus formed is usually packed from the bottom side now being opened, and the bottom side is thereafter fused and sealed. On the

contrary, it may be possible to provide the bag body having the bottom side initially sealed. In this case, the content is packed from the upper opening by opening the zipper element 30 and the zipper element 30 is then closed and the upper end portion 28a is finally sealed. In the present invention, it is possible to fix the zipper element 30 to the opened surface of the bag body with the male and female members 31 and 35 being engaged.

A gusset bag 2 provided with a zipper element will be described hereunder as a second embodiment of this invention in accordance with its forming with reference to FIGS. 10 to 16.

First, as shown in FIG. 10, a cylindrical or tubular bag body 50 is prepared and the bag body 50 is composed of substantially the same structure as that of the first embodiment shown in FIG. 1. Namely, the bag body 50 is composed of a pair of opposing flat portions 51 and 51 constituting front and back portions of the bag body 50 and two side portions 61 and 61 each having an inwardly folded line 63 extending along substantially the central line of the side portion 61. The bag body 50 is formed of a material substantially the same as that of the first embodiment.

Next, as shown in FIG. 11, an opening of the bag body 50 is opened by partially pulling out and folding reversely, i.e. outwardly, the folding line 63 and 63 with optional

points P' and P' being base points. Namely, portions of the folding lines 63 and 63 each having a length from the point P' to a point H' at the upper end of the bag body 50 are pulled out and reversely folded as folding lines 63a and 63a. According to this reverse folding lines connecting the four corner portions D' to the points P' are formed as four arris lines 67, which are inwardly projected inside the bag body 50 as shown in FIG. 11 or 12. In this second embodiment, since a gusset bag having a relatively large folding width (corresponding to a line connecting the points H' and D') is intended, the position of the points P' are determined, for example, to satisfy the relationship of the line $H'P' > H'D'$.

As shown in FIG. 13, in the next step, the upper portions of the flat portions 51 and the side portions 61 are together folded or bent outward with a base line K' which connects the points H' and H' , i.e. upper ends of the outwardly folded lines 63a, being the base line, thus forming four opened surfaces 51a, 51a and 61a, 61a as exposed inner side surfaces of the bag body 50. In this step, the bag body 50 is delivered in a direction N' , and during this step, the belt like male member 31 and female member 35 forming the zipper element 30 are conveyed above the opened surfaces 51a and 61a along a direction J' , thus the conveying directions N' and J' of the bag body 50 and the zipper element 30 accord with each other, whereby the

working of the bag body can be easily made, and is suitable for a machine working.

Further, in the next step, as shown in FIG. 14, the male member 31 and the female member 35 forming the zipper element 30 are fixed to the exposed opened surfaces 51a and 61a at portions apart from equal distances from the central line, i.e. line K', usually in parallel with each other. The fixing of the male and female members 31 and 35 is usually effected by a heat seal method.

Then, as shown in FIG. 15, the opened surfaces 51a and 61a are closed so that the male and female members 31 and 35 are mated and engaged with each other so as to function as the zipper element 30. Thereafter, a fused seal portion 78 is applied, and this portion is composed of the upper end portion 78a forming the opening end of the bag body 50 and the folded side portions 78b and 78b which are both fused at the upper sides thereof so that the fused seal portion 78 of the bag body 50 forms a tight close seal portion. After this step, substantially triangular tubs 88 and 88 projecting from the sides of the bag body 50 which are formed when the opened surfaces 51a and 61a are mated are cut out along the vertical side ends of the bag body 50, thus completing the gusset bag provided with the zipper element such as shown in FIG. 16.

A content to be contained in gusset bag thus formed is usually packed from the bottom side now being opened, and

the bottom side is thereafter fused and sealed. On the contrary, it may be possible to provide the bag body having the bottom side initially sealed. In this case, the content is packed from the upper opening by opening the zipper element 30 and the zipper element 30 is then closed and the upper end portion 78a is finally sealed.

According to these first and second embodiments of this invention, the bag body is preliminarily formed by an ordinary manner. Then, the side portions of the upper opening portion of the bag body are folded or bent outwardly in directions reverse to those once being folded inwardly along the folding lines to thereby partially expose the inner surfaces of the flat portions and the side portions of the upper portion of the bag body. The male and female members constituting the zipper element are attached to the exposed surfaces so as to be engaged with each other when they are mated. According to this structure, the zipper element can be easily and securely attached to the bag body.

A third embodiment of a gusset bag provided with a zipper element according to this invention will be further described hereunder with reference to FIGS. 17 to 22.

First, referring to FIG. 21, a gusset bag 100 provided with a zipper element 130 has a bag body 110 composed of a pair of opposing flat portions forming front and back portions 111 and 113 of the bag and two side portions 121 and 123 having folding lines 123 and 123 which extend

vertically substantially along the central lines of the side portions and along which the side portions 121 and 121 are folded inwardly. The bag body 110 is usually formed as a cylindrical or tubular body and made of a plastic film, paper, aluminium foil or lamination member of these materials, but according to this embodiment, the material for the bag body and the thickness thereof have no specific limitation. The zipper element 130, composed of male and female members, mentioned hereunder, is formed to the inner surfaces of the flat portions 111 and 113 at portions near an opening, i.e. mouth portion Q of the bag body 110. The zipper element 130 is formed to freely open or close the opening Q of the bag body 110 and usually formed of general kind of plastic material.

The bag body 110 has a fused seal portion 128, shown with hatching lines in FIG. 21, which seals an upper end area 128a of the opening Q of the bag body 110 and side areas 128b and 128b extending from both ends of the upper end area 128a towards portions further downward a fixing portion S of the zipper element 130. That is, the side areas 128b and 128b extend downward, in the illustrated state, beyond the zipper element fixing line S.

The zipper element 130 will be attached to an exposed inner surface portion of the bag body 110 which is formed by forming cuts from the upper end of the bag body along the connecting portions of one flat surface portion to the side

portions by predetermined lengths and bending the one flat portion with the base line connecting the bottoms of the cuts. This condition will be described hereunder with reference to the forming steps of the gusset bag 100.

The zipper element 130 has a belt shape structure as shown in FIG. 22, in combination of a male member 131 and a female member 135 to be engaged with the male member 131. The male member 131 is composed of a flat base plate 132 and a belt like protruded portion 133 formed on one side of the base plate 132. The other side 132a of the base plate 132 has a flat surface capable of being bonded to the inner surface of one flat portion 111 of the bag body 110. The female member 135 is composed of a flat base plate 136 and a belt like member 138 having a recessed portion formed on one side of the base plate 136. The other side 136a of the base plate 136 has a flat surface capable of being bonded to the inner surface of the other flat portion 111 of the bag body 110. The sizes of the protruded portion of the male member 131 and the recessed portion of the female member 135 are designed to be tightly engaged with each other when mated.

The gusset bag 100 according to the third embodiment of this invention is formed by way of the following steps.

First, with reference to FIG. 17, there is prepared a cylindrical or tubular bag body 110 composed of a pair of flat portions 111 and 113 constituting front and back side portions of the bag body 110 and two side portions 121 and

121 having lines 123 and 123 folded inwardly, the lines extending vertically substantially along the central lines of the side portions 121 and 121.

Next, as shown in FIG. 18, two cuts are made along lines connecting the side portions 121 and 121 to the flat portions 111 and 113 at two corner portions, for examples C and E of the four corners A, B, C and E, of the bag body 110 so as to extend from the upper ends, i.e. opening ends, of the bag body to portions each apart from the upper end by a predetermined distance. These cuts have substantially the same cut depth. These cuts are formed to ensure a portion to which the zipper element 130 can be surely attached.

Then, as shown in FIG. 19, the flat portions 111 and 113 and the side portions 121 and 121 are bent outward along the base line Y connecting the bottom portions of the cuts to expose opened inner surfaces 111a and 113a of the flat portions, in which the exposed surface 111a is only a portion of one flat surface 111 and the exposed surface 113a includes a portion of the other flat surface 113 and the side portions 121 in this embodiment. In this step, the bag body 110 is delivered in a direction N, which accords with the delivered direction of the zipper element 130 above the exposed surfaces 111a and 113a, and thus the bag body is easily worked and the steps are suitable for machine working.

Further, in the next step, as shown in FIG. 20, the

male member 131 and the female member 135 forming the zipper element 130 are fixed to the exposed opened surfaces 111a and 113a, respectively, at portions apart by equal distance from the base line Y usually in parallel with each other. The fixing of the male and female members 131 and 135 is usually effected by a heat seal method.

Then, as shown in FIG. 21, the opened surfaces 111a and 113a are closed so that the male and female members 131 and 135 are mated and engaged with each other so as to function as the zipper element 130. Thereafter, a fused seal portion 128 is applied, and the seal portion 128 is composed of an upper end portion 128a forming the opening end of the bag body 110 and the folded side portions 128b and 128b extending downward from the upper end portion 128a, near the upper ends of the cuts, both fused at the upper sides thereof so that the fused portion 128 of the bag body 110 forms a tight close seal portion (the sealing surface being shown with hatching lines in FIG. 21), thus completing the gusset bag provided with the zipper element 130.

A content to be contained in gusset bag thus formed is usually packed from the bottom side now being opened, and the bottom side is thereafter fused and sealed. On the contrary, it may be possible to provide the bag body having the bottom side initially sealed as disclosed with reference to the former first and second embodiments.

According to the third embodiment of this invention,

the bag body is preliminarily formed by an ordinary manner. Then, the two cuts are made from two corner portions of the upper end of the flat portion of the bag body. The flat portions of the upper opening portion of the bag body are bent outwardly to thereby partially expose the inner surfaces of the flat portions. The male and female members constituting the zipper element are attached to the exposed surfaces, respectively. According to this structure, the zipper element can be easily and surely attached to the bag body.

Another embodiment of this invention will be described hereunder with reference to FIGS. 23 to 28, and this embodiment is concerned with a flat bag provided with a zipper element.

First, referring to FIG. 27, a tubular flat bag 200 provided with a zipper element 220 comprises a bag body 210 generally composed of a pair of flat portions 211 and 215 opposing to each other constituting front and back portions of the bag body 210. The zipper element 220 comprises male and female members, mentioned hereinafter, to be mated with each other which are attached to the inner surfaces of the flat portions at portions near an upper end, as viewed, of the bag body 210 constituting an opening thereof and adapted to freely open the opening. The zipper element 220 is usually formed of a plastic material. The tubular bag body 210 is basically formed of one sheet material by bonding

together both end sides of the sheet before the attachment of the zipper element 220, and accordingly, the bonded end portion appears on the back surface of the bag body 210 as a protruded edge like portion 217 in FIG. 27. The front and back portions 211 and 215 of the bag body 210 are made continuous through folded lines 212 and 214 as side lines. A fused seal portion 235 is formed to the opening end portion of the bag body 210 so as to entirely seal the opening thereof. The bag body 210 may be formed of a plastic film, a paper, an aluminium foil or a lamination thereof, but it is not limited to such material and the thickness thereof may be optionally selected as occasion demands. The fused seal portion 235 includes an end seal portion 234 extending substantially along an entire length of the end opening, and side fused seal portions 231, 233 which extend downward from both lateral ends of the upper seal portion along the folded lines 212 and 214 to portions below the attachment of the zipper element 220. This is because, as mentioned hereinafter, the once opened opening end portion is sealed thereafter.

The zipper element 220 has a belt shape structure, as shown in FIG. 28, in combination of a male member 221 and a female member 225 to be engaged with the male member 221. The male member 221 is composed of a flat base plate 222 and a belt like protruded portion 223 formed on one side of the base plate 222. The other side 222a of the base plate 222

has a flat surface capable of being bonded to the inner surface of one flat portion of the bag body 210. The female member 225 is composed of a flat base plate 226 and a belt like member 228 having a recessed portion formed on one side of the base plate 226. The other side 226a of the base plate 226 has a flat surface capable of being bonded to the inner surface of the other flat portion of the bag body 210.

The sizes of the protruded portion of the male member 221 and the recessed portion of the female member 225 are designed to be tightly engaged with each other when mated.

The flat bag 200 according to this embodiment of this invention is formed by way of the following steps.

First, with reference to FIG. 23, there is prepared a cylindrical or tubular bag body 210 provided with a pair of flat portions 211 and 215 constituting front and back side portions of the bag body 210, which are mated and bonded together as protruded edge like sealed portion 217. This preparation of the bag body 210 is performed by a conventional method.

Next, as shown in FIG. 24, two cuts 212a and 214a are made from both the ends of the upper opening of the bag body 210 along the folded lines 212 and 214 so as to have cut depths each having a predetermined length from the upper end. The line connecting the bottom or end portions of these cut depths is mentioned as a base line Z to form an exposed surface portions 211a and 215a, and as shown in FIG.

25, the flat portions 211 and 215 are folded or bent outward along the base line Z so as to expose the inner surfaces 211a and 215a of the flat portions 211 and 215. During this step, the bag body 210 is delivered along a direction N, which accords with the delivering direction J of the zipper element 220 above the exposed surfaces 211a and 215a, and thus the bag body is easily worked and the steps are suitable for machine working.

Further, in the next step, as shown in FIG. 26, the male member 221 and the female member 225 forming the zipper element 230 are fixed to the exposed opened surfaces 211a and 215a, respectively, at portions apart from the base line Z, by equal distances usually in parallel with each other. The fixing of the male and female members 221 and 225 is usually effected by a conventional heat seal method.

Then, as shown in FIG. 27, the opened surfaces 211a and 215a are closed so that the male and female members 221 and 225 are mated and engaged with each other so as to function as the zipper element 220. Thereafter, the upper end portion forming the opening end of the bag body 210 and the cut portions, near the upper ends of the folded lines 212, 214, are fused and sealed so as to form the tightly closed fused seal portions 235, 231 and 233 (the sealing surface being shown with hatching lines in FIG. 27), thus completing the flat bag 200 provided with the zipper element 220.

A content to be contained in the flat bag thus formed

is usually packed from the bottom side now being opened, and the bottom side is thereafter fused and sealed. On the contrary, it may be possible to provide the bag body having the bottom side initially sealed as disclosed with reference to the former embodiments.

According to this embodiment, the bag body is preliminarily formed by an ordinary manner. Thus, the side end portions of the upper opening portion of the bag body are cut by predetermined lengths along the folded lines to thereby bent outwardly to partially expose the inner surfaces of the flat portions of the upper portion of the bag body along the base line connecting the bottoms (or ends) of the two cuts. The male and female members constituting zipper element are attached to the exposed surfaces, respectively. According to this structure, the zipper element can be easily and surely attached to the bag body.

It is to be understood that this invention is not limited to the embodiments described above and many other changes or modifications may be made without departing from the scope of the appended claims.

It can be seen that the embodiments described in detail above substantially eliminate defects or disadvantages encountered in the prior art and provide gusset bags and flat bags provided with zipper elements which are easily attached to the bags and also provide methods of forming these bags provided with zipper elements.

CLAIMS

1. A gusset bag (1; 2) having one end to be formed as a bottom end and another end to be formed as an end opening through which a content packed in the gusset bag is taken out, the gusset bag characterized by:

a bag body (10; 50) having a tubular structure and composed of a pair of opposing flat portions (11,11; 51,51) constituting front and back side portions of the bag body and two side portions (21,21; 61,61) connecting front and back side portions at both side ends thereof and respectively having lines (23,23; 63,63) folded inward which extend along longitudinal directions of the side portions and along which the side portions are folded inward;

a zipper element (30) mounted on inner surfaces (11a,11a; 51a,51a) of the flat portions at portions near the end opening of the bag body; and

a fused seal portion (28; 78) formed to and near the end opening portion of the bag body to substantially entirely seal the end opening portion, said fused seal portion including an end seal portion (28a; 78a) extending substantially along an entire length of the end opening and side seal portions (28b,28b; 78b,78b) extending from both ends of the end seal portion along the side ends of the flat portions (11,11; 51,51) of the bag body, said side seal portions each extending beyond the portions on which the

zipper element is mounted, wherein a sealing process is carried out integrally with portions of the side portions near the end opening of the bag body, which are once inwardly folded along the folding lines and then drawn out and folded outward from the end opening of the bag body for once opening the end opening.

2. A gusset bag according to claim 1, wherein said zipper element extends throughout a whole horizontal length of the bag body and said zipper element comprises a male member (31) to be attached to inner surfaces of one of the flat portions of the bag body and the side portions thereof and a female member (35) to be engaged with the male member and attached to exposed inner surfaces of another one of the flat portions of the bag body and the side portions, said male and female member being attached at portions apart by equal distances from the end opening of the bag body.

3. A method of forming a gusset bag provided with a zipper element characterized by the steps of:

preparing a bag body (10; 50) having a tubular structure and composed of a pair of opposing flat portions (11,11; 51,51) constituting front and back side portions of the bag body and two side portions (21,21; 61,61) connecting front and back side portions at both side ends thereof and respectively having lines (23,23; 63,63) folded inward which

extend along longitudinal directions of the side portions and along which the side portions are folded inward;

preparing a zipper element (30) and mounting the zipper element on the flat portions at portions near the end opening of the bag body; and

fusing the end opening of the bag body together with the outwardly folded side portions thereof to thereby seal an end opening portion of the bag body.

4. A method according to claim 3, wherein the zipper element comprises male and female members attached at portions near the end opening of the bag body.

5. A method according to claim 3 or 4, wherein the preparing step includes a cutting step for cutting the bag body from the end opening thereof along lines connecting the flat portions and the side portions of the bag body to form four cuts (15,15,15,15) each having a predetermined length.

6. A method according to claim 3, 4 or 5, wherein the fusing step is performed by a heat seal method.



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**The
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Claims searched: 1-6

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.N): B5D (DSS1, DSF); B8K (KBA)

Int Cl (Ed.6): B31B 1/90 19/90 29/90; B65D 33/16

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 4655862 (CHRISTOFF) See Figures 2 and 15	1,3

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.